

## CLAIMS

1. Electrophoretic system comprising a separation system and a detection system,  
said separation system comprising a channel (1) and a first separation electrode  
5 (2) located at a first end of the channel (1) and a second separation electrode (3) located  
at a second end of the channel (1),

said separation system being arranged in such a way that a potential difference  
can be applied between the first and second separation electrodes (2, 3),  
said detection system, in use, being positioned close to channel (1) or inside the  
10 channel (1)

**characterised in that**

the electrophoretic system comprises means to reduce a voltage difference  
between the separation system and the detection system in order to prevent electrical  
breakthrough between the separation system and the detection system, where said  
15 means to reduce said voltage difference comprise a DC-voltage source (21).

2. Electrophoretic system according to claim 1, **characterised in that** at least one  
potential sensor (20) is provided located close to the detection system, which controls  
the DC-voltage source (21).  
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3. Electrophoretic system according to any of the preceding claims,  
**characterised in that** the detection system comprises one or more electrodes (11,  
12, 13, 14) and a first AC-voltage source (7) and a conductivity of a liquid is  
determined by measuring parameters obtained from the electrodes (11, 12, 13, 14).  
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4. Electrophoretic system according to any of the preceding claims,  
**characterised in that** the detection system comprises four electrodes (11, 12, 13, 14)  
having two outer electrodes (11, 12) and a first AC-voltage source (7) connected to the  
two outer detection electrodes (11, 12) and a conductivity of a liquid in said channel (1)  
30 is determined by measuring parameters obtained from the electrodes (11, 12, 13, 14).

5. Electrophoretic system according to claim 3 or 4, **characterised in that** the  
one or more electrodes (11, 12, 13, 14) are in galvanic contact with the liquid.

6. Electrophoretic system according to claim 3, 4 or 5, **characterised in that** a second AC-voltage source (9) is connected to the second separation electrode 3.

5        7. Electrophoretic system according to claim 6, **characterised in that** the second AC-voltage source (9) is controlled by the first AC-voltage source (7).

8. Electrophoretic system according to claim 7, **characterised in that** said first AC-voltage source (7) is connected to said second AC-voltage source (9) via an  
10    amplifier (8).

9. Electrophoretic system according to claim 8, **characterised in that** said amplifier (8) has an amplification factor equal to or smaller than 1.